

TRENDS IN THE ECONOMIC HISTORY OF MATHURA

(c. 300 B.C. - A.D. 300)

Evidence from Pali texts and archaeology suggests that Mathura was a considerable settlement in Maurya times. North Black Polished (NBP) ware sherds have been found in excavations at Mathura and Sonkh and also in explorations at several places in Mathura district. Although settlements at Mathura had started around the sixth century B.C. with the people who used Painted Grey Ware, they became substantial by c. 300 B.C. But coins, inscriptions and archaeology show that the real importance of Mathura as an urban centre started in the first century A.D.; about this time we find brick structures, roofing tiles, fortifications, etc.¹ Mathura became a great centre of trade and crafts and of religion and administration in the first two Christian centuries in the Saka-Kuṣāṇa phase.

The great economic importance of Mathura was not derived from its hinterland or from the resources of that region. It has a desert type of climate². Sandholes and ravines mark the bank of the Yamuna³, and cultivation on the banks bordering the ravines is poor⁴. At Mathura the annual average rainfall is 21.43''⁵. Except during the brief south-west monsoon season the air over the district is generally dry⁶. The Mathura soil is good for excavators but bad for cultivators. However, the land adjacent to the Yamuna is quite often very fertile⁷, but still irrigation is needed for the major part of the district. Till recent times a good part was irrigated by the *rahat* or Persian wheel system, but this contrivance was not known in the early centuries of the Christian era.

1. *Indian Archaeology 1974-75 - A Review*, p. 50; *ibid.* (1975-76), p. 55.

2. *Uttar Pradesh District Gazetteers*, Mathura, 1968, pp. 5-6.

3. *Ibid.*, p. 6.

4. *Ibid.*, p. 7.

5. *Ibid.*, p. 9.

6. *Ibid.*, p. 10.

7. *Ibid.*, p. 6.

Although the district is a part of the Indo-Gangetic alluvium⁸, because of less rainfall it was not capable of producing much in ancient times. Probably it produced wheat, barley, millet, rice and pulses, but whether the rural base of Mathura was strong enough to support its urban settlement is doubtful. Mathura, however, is famous for its *tamāla* trees, and according to the *Periplus Maris Erythraei* spices in the form of green-leaves were imported from India⁹. According to Wilfred H. Schoff the imported spice is the leaf of the *tamāla* tree, which is a variety of cinnamon or laurel¹⁰. Mathura may have contributed to the export of this spice from India. The mention of *cūtaka vihāra* suggests that Mathura also produced mangoes. Probably the Mathura artisans produced some luxury and essential goods for local use and export. Otherwise it is very unlikely that the natural resources/products of Mathura enabled it to pay its way.

We have no idea about the land system or the agricultural methods prevalent in the Mathura region. Finds of votive tanks in excavations and numerous references to the construction of wells, tanks and water reservoirs for religious purposes in inscriptions¹¹ suggests that the practice of providing water facilities may have also been followed in the countryside where it promoted the supply of water for both drinking and irrigation. Such facilities may have been organised individually or collectively; the state does not seem to have played any important part in it.

While some land grants were made by the Sātavāhanas in Maharashtra, none seems to have been made by the Kuṣāṇas unless it is understood in terms of indirect grant of land for the construction of monasteries, tanks, reservoirs, etc. The term *akṣayanīvi*, which indicates perpetual land tenure in a Sātavāhana inscription, is used in a Kuṣāṇa epigraph from Mathura¹², but not in the context of land grant. In villages headmen seem to have been men of importance, and the *grāmika* is mentioned in two Mathura inscriptions¹³ and one of them had more than one wife¹⁴. Probably he assessed and collected taxes from the peasants, as was the case with the *gāmasāmika*, mentioned in the *Milinda-pañho*¹⁵. Possibly he collected from the peasants *praṇaya*, *viṣṭi*, and taxes levied on their fruits and flowers from which they were exempted by Rudradāman in the construction of the Sudarśana lake. At any rate he may have collected the royal share of the produce. According to Agarwala *kālavāḍa* or *kārapāla*, collector of taxes, mentioned as one of the

8. *Ibid.*, p. 8.

9. P. H. L. EGGERMONT, *The Muruṇḍas and the Ancient Trade-Route from Taxila to Ujjain*, JESHO, IX (1966), 278-79.

10. *Ibid.*, p. 279.

11. *Lüders' List*, nos. 64, 82, 102; AGARWALA, in JUPHS, XXII, p. 204; XXIII, p. 75.

12. *Sel. Inscr.*, p. 207, l.2; *ibid.*, p. 152, ll.3, 11-12; p. 157, l.1.

13. *Lüders' List*, nos. 48, 69a.

14. *Ibid.*, no. 48.

15. *Trenckner's edn*, p. 147.

donors at Mathura, was an official of high rank whose title was in vogue even before the rise of the Kuṣāṇas¹⁶. It seems that in the Mathura region or in northern India there was hardly any class of landed intermediaries between the state and the peasants during the period we are considering.

An overall view of Mathura and whatever we can infer about its resources and its land system would show that it did not enjoy any special advantage from the agrarian point of view. The carrying capacity of its soil was poor. We have no means to show that taxes collected from the peasants were sufficient to maintain administrative and other establishments at this place during the Saka or the Kuṣāṇa regime. In spite of this archaeology and other sources of evidence indicate continuous progress of Mathura in structure and artifacts from the 3rd century B.C. to the 3rd century A.D. How did this happen? Mathura obviously owed all this to its pivotal position as a great clearing house of commodities, for it was well connected with Central Asia through the north-western route and also with the western coast through the Ujjain route. It was certainly situated at the centre of four cross-roads¹⁷, if not several more as pointed out by Professor Bajpai¹⁸. The merchants undoubtedly played a significant role in the economic life of the city. Known by different terms such as *vaṇik*, *śreṣṭhin*, *sārthavāha*, *vyavahārin*, etc., at least twelve merchants are mentioned as donors in inscriptions from Mathura¹⁹. If we add the number of several *gandhikas*²⁰ (literally perfumers but generally merchants) the total number would reach seventeen. The merchants were rich enough to set up their monastery²¹; so were the goldsmiths²² or *sauvarṇikas*, who are repeatedly mentioned²³. All types of jewellery are profusely represented in sculptures²⁴. We notice earrings, bracelet, double bracelet, necklace, double necklace, breast jewel, bangle, anklet, torque, bangles including the heavy ones, armlets, wristlets, crown, amulet string, ear-pendants, and metallic chain²⁵. But earrings, bracelet and necklace figure commonly²⁶. A gold leaf has been discovered at Sonkh. Apparently all this accounts

16. JUPHS, XXIII, no. E, p. 147.

17. EGGERMONT, *op. cit.*, p. 293.

18. SHIVA G. BAJPAI, *Mathura: Trade Routes, Commerce, and Communication Patterns from the Post-Mauryan Period to the End of the Kuṣāṇa Period*, paper presented to the Seminar on Mathura in New Delhi, January 1980.

19. V. S. AGARWALA, in JUPHS, XXXI, no. 121, p. 65; *Lüders' List*, no. 140, Addition and Correction, nos. 105, 24, 41; *MI*, nos. 44, 65, 172, etc.

20. *Lüders' List*, nos. 37, 39, 68, 76; V. S. AGARWALA, in JUPHS, XXIII, no. B2 (p. 39), 1,2.

21. *Lüders' List*, no. 140, p. 140, p. 174, Addition and Correction.

22. V. S. AGARWALA, in JUPHS, XXII, p. 193, no. 260.

23. *Lüders' List*, nos. 95, 150, 168.

24. V. S. AGARWALA, in JUPHS, XXI-XXIII.

25. *Ibid.*

26. *Ibid.*

for the importance of goldsmiths, who, as artisans and merchants, served the needs of the upper crust of society.

This brings us to the question of semi-precious stones and possibly art objects. Fine textiles were produced in Mathura which was famous for its *śāṭaka*²⁷, a special kind of cloth. But in the period under review Mathura also traded in some essential commodities. We frequently come across iron mongers²⁸, suggesting thereby that agricultural implements needed by the ordinary folk in the countryside were manufactured and supplied by them although war weapons which are so frequently represented in sculptures and also in coins may have received priority in trade.

This leads us to the nature of trade in the Mathura region. A good many articles of trade seem to have been luxury and prestige objects. Trade in silk, when temporarily disturbed on the Central Asian route, was diverted to the eastern part of the Roman empire via Broach through the *uttarāpatha* which touched Mathura and from where goods went to the western coast via Vidisa, Ujjain. We hear of horse-dealers from Taxila passing through Mathura²⁹. In addition to this the merchants of Mathura may have participated in trade in ivory objects, glass goods, semi-precious stones and possibly in art objects.

Six types of lances³⁰, six types of swords³¹, various types of sheaths³², three types of shields³³, and five types of daggers³⁴ are known from the sculptures of the period. These sculptures obviously belong to the 2nd century B.C. - 2nd century A.D. In addition to these numerous weapons of the period are mentioned in ch. IX of *Life* by N. P. Joshi. Vogel³⁵ and V. S. Agarwala³⁶ refer to many swords, spears, daggers, etc. Thus sculptures suggest that weapon-making was a thriving industry, and inscriptions indicate that blacksmiths and traders in iron objects were an important group, and their activities may have something to do with the steel goods that were sent to Rome where there was a complaint on waste of gold in purchasing the Indian cutlery. There also seems to have been some trade in brass goods at Mathura. A piece of brass rod, and brass hook, have been found³⁷, and we also get a refe-

27. PATAÑJALI, I.1.2; KIELHORN, I.19.

28. Lüders' List, nos. 29, 53 & 54.

29. EGGERMONT, *op. cit.*, p. 293.

30. N. P. JOSHI, *Life in Uttarāpatha*, pp. 256, 259.

31. *Ibid.*

32. *Ibid.*, pp. 261, 263.

33. *Ibid.*, p. 263.

34. *Ibid.*, p. 264.

35. VOGEL, AMM, C no. F.27 (p. 199), C no. F.1 (p. 111), C no. F.13 (p. 145), C no. E.13 (p. 108), C no. 73 (p. 112), C no. 732 (p. 116).

36. JUPHS, XXII, no. 1022 (p. 140), no. 1579 (p. 140), no. 592 (p. 152), no. 724 (p. 152), no. 2028 (p. 152), no. 889 (p. 158), no. 738 (p. 160), no. 739 (p. 161), no. 126 (p. 161), no. 604 (p. 165), no. 739 (p. 161), no. 126 (p. 161), no. 604 (p. 165), no. 739 (p. 205), no. 1244 (p. 205), no. D 46 (p. 167), no. 269 (p. 167), no. 894 (p. 168), no. 936 (p. 168), no. 938 (p. 168), no. 100 (p. 168).

37. AGARWALA, in JUPHS, XXI, no. 2799 (p. 79).

rence to brass scissors meant for cutting arecanuts³⁸. But still even in the houses of upper class people pottery was not replaced by brass/bronze utensils for eating and cooking purposes.

Numerous representations of tunics³⁹, trousers⁴⁰, scarfs⁴¹, shawls⁴², draperies⁴³, turban, head dresses⁴⁴, etc., in sculptures might suggest the needs of soldiers and upper class of society, but representations of *dhotīs*⁴⁵ and *sāris*⁴⁶ suggest that the needs of the common people in the city were not ignored. We also hear of cotton-dealers⁴⁷. Similarly the existence of the guild of flour-makers⁴⁸ suggests that wheat, barley or millet flour was sold to the urban population. Thus we have some evidence to show that essential articles meant for day to day needs had become marketable.

As stated above, in many cases it is difficult to demarcate between artisans and traders. Goldsmiths, for instance, who had set up their own monastery, functioned as both traders and artisans. Although we may not be able to pinpoint such cases, there is no doubt that the later phase of the post-Maurya period saw a phenomenal progress in artisanal activities in northern and western India in whose trade Mathura participated as a great transit centre.

The general economic climate in northern India was favourable. The *Milinda-pañho* lists as many as seventy-five occupations⁴⁹, about sixty of which were connected with various kinds of crafts; eight crafts were associated with the working of such mineral products as gold, silver, lead, tin, copper, brass, iron, and precious stones or jewels⁵⁰. The *Mahāvastu* mentions a variety of brass (*ārakūṭa*), zinc, antimony and red arsenic⁵¹. All this shows considerable advance and specialisation in the working of various kinds of metal. Chemical examination of iron

38. VOGEL, AMM, C no. V.31 (p. 202).

39. K. D. BAJPAI, in JUPHS, XXI, no. 12, p. 127. Many examples of tunic have been quoted by Vogel and Agarwala.

40. AGARWALA, in JUPHS, XXI, pp. 43, 66; XXII, pp. 129, 167, 174, 195; VOGEL, AMM, pp. 84, 94, 110.

41. AGARWALA, in JUPHS, XXI, no. 485 (p. 67), no. 746 (p. 69), no. 1366 (p. 72), no. 1410 (p. 72), no. 2739 (p. 75), no. 2798 (p. 77). Several instances are quoted in JUPHS, XXII also. Other examples are given by Vogel in AMM, pp. 112-14, 137, 141-42, 144-48, 153.

42. VOGEL, AMM, C no. E.21 (p. 110), C no. 22 (p. 110), C no. 226 (p. 121).

43. AGARWALA, in JUPHS, XXI, pp. 64, 66, 68-9, 71-4, 77.

44. *Ibid.*, pp. 67, 70-1; VOGEL, AMM, pp. 113-16, 120-21, 124, etc.

45. There are more than a dozen references to *dhotī* in VOGEL, AMM, pp. 56-8, 62, 64, 83, 88, 90-9, etc. Agarwala makes seven references to it in JUPHS, XXI, pp. 47, 67, 69-72, 75, 127, 142.

46. K. D. BAJPAI, in JUPHS, XXI, no. 3, p. 119.

47. *Lüders' List*, no. 15.

48. EI, XXI, no. 10.

49. P. 331.

50. *Milinda*, p. 331.

51. *Senart's edn*, II.106.

artifacts shows that by *circa* 100 B.C. steelmaking was known in India⁵², and the *Milinda* tells us something about the process employed in making iron objects. According to it even when beaten black iron carries weight and it does not vomit up the water it has once soaked in⁵³. Apparently on account of large scale production of iron goods Indian iron and steel are mentioned in the *Periplus* as imports into the Abyssinian ports. That Mathura had an important group of artisans and traders dealing in iron goods is clear from numerous epigraphic references, although we do not know the source of their supply of iron ores which may have come from considerable distance.

Textile manufacture was another important handicraft in the period under review. According to the *Milinda-pañho* five processes of cloth manufacture were undertaken by Gotamī, the aunt of the Buddha⁵⁴. But it should be understood that in spite of the use of wheels in numerous other objects such as pottery, carts/chariots, oil-making, the spinning wheel or *charkhā* was not known. Spindles and whorls seem to be the instruments meant for spinning. The presence of cotton-dealers and representations of numerous types of cloth coupled with the reference to the Mathura *śāṭaka* in Patañjali shows that it was an important centre of cloth manufacture with a considerable population of weavers. Silk weaving may have also been practised at Mathura, for along with cloth making and the making of arms and luxury articles it is mentioned in the *Milinda*⁵⁵. However, it is still not clear as to when the art of growing silk worms fed on mulberry leaves appeared in India. In any case it is a measure of the importance of the weaving class that Manu recommends levy of taxes on the produce of weavers.

Textile manufacture was supplemented by tailoring, which seems to have been known in the age of the Buddha. But the craft received special impetus because of the new type of the seven dresses introduced by the Indo-Scythians. Tunics, trousers, cloak or mantle, coloured coat, overcoat, embroidered coat, skirts, petticoat, conical hat, long-sleeved tunics, long trousers, etc., are represented repeatedly in Mathura sculptures, and have been noted by Vogel, Agarwala and K. D. Bajpai. Apparently all this provided sufficient work for tailors (*pravarika*) who are mentioned several times as donors in Mathura inscriptions⁵⁶. It is interesting to note that tailors were rich enough to set up their own monastery⁵⁷. Besides tailoring, dyeing was another subsidiary occupation, and we hear of a donation made by the wife of a dyer (*rayaginī*)⁵⁸. Outside

52. D. P. AGARWALA & A. GHOSH, ed., *Radiocarbon and Indian Archaeology*, Bombay, 1973, pp. 398-99.

53. P. 415.

54. P. 240.

55. P. 331.

56. *MI*, nos. 7, 74, 81, 124 & 133.

57. *Ibid.*, no. 74.

58. *Lüders' List*, no. 32.

Mathura we have several references to dyers and in an excavation in Tamil Nadu a dyer's vat has been discovered.

Pottery seems to have been a thriving craft at Mathura in the post-NBP phase. Apart from various types of red ware found in excavations, jars, vases, bowls, pitchers, large vessels, goblets, cups, etc., are found represented in sculptures, and have been noted by Vogel⁵⁹ and Agarwala⁶⁰. A characteristic feature of some pots discovered from Mathura is their thin walls, particularly of sprinklers with bottle necks. Their walls are thinner even than those of NBP, and this thinness shows more skill and better technology. In any case sprinklers, which seem to have been a typical feature of pottery in the first two or three centuries of the Christian era, were present at Mathura. They may have been used either for religious purposes or for sprinkling perfumed water by affluent sections of society in the city.

In view of the profuse number of sculptures found in Mathura, especially those in red sandstone⁶¹, we may visualise the presence of a large number of sculptors. Several sculptors are mentioned in inscriptions⁶². Probably they were literate enough to incise their names. It appears that architectural activities such as housemaking, pillar making (especially sacred ones), fortification, etc., constituted an important form of artisanal activity. The Kuṣāṇas introduced new types of shafts⁶³, which may have employed quite a few masons. At any rate these activities provided livelihood for a good number of people. Terracottas are found in good numbers, and their makers flourished in an urban milieu, as has been shown by Devangana Desai⁶⁴.

Because of the urban milieu a sizable class of entertainers including actors, dancers, etc.⁶⁵, appears as donors for religious purposes⁶⁶. We also notice musical instruments, which are represented in sculptures⁶⁷. This would suggest that a few artisans were engaged in the manufacture of these instruments. Since numerous slabs, tablets, images, etc., were set up, it is evident that sculptors were in good demand and probably paid handsomely.

Although we know something about artisanal and trading activities at Mathura, we have no means to find out the prices of different products and the nature of their distribution. We have no idea about the nature of taxes that were collected nor of the way they were disbursed. We have some idea about the large-scale donations that were made in

59. AMM, pp. 109, 111, 162, 199, 201-4.

60. JUPHS, XXII, pp. 165, 180-86, 190-91, 193, 201, 204-5.

61. VOGEL, AMM, p. 188; AGARWALA, in JUPHS, XXII, pp. 158, 188.

62. MI, nos. 7, 146-49.

63. JOSHI, *Life in Uttarāpatha*, ch. II.

64. *History and Society Essays in Honour of Professor Niharranjan Ray*, ed., D. P. CHATTOPADHAYAYA, Calcutta, 1978, pp. 153-61.

65. K. D. BAJPAT, in JUPHS, XXI, p. 129; AGARWALA, in JUPHS, XXII, p. 186.

66. MI, no. 27; Lüders' *List*, nos. 85, 100.

67. VOGEL, AMM, p. 126; AGARWALA, in JUPHS, XXII, pp. 186-87; XXIII, p. 131.

Matuhra; more than 370 inscriptions deal with this subject. Most gifts were made in favour of the Buddhist cause, the Jains cause came second, and the brāhmanical gods were a very poor third. Kṛṣṇa, the popular god of Mathura, does not find any place in donative inscriptions known to me. Every donation was a form of economic activity, but most donations were made for non-functional, unproductive purposes, and did not promote the cause of production. If we leave out donation of tanks, water reservoirs, monasteries, etc., and the donation of money to the guild of flour makers for feeding the brāhmaṇas, it will appear that most gifts were useless from the economic point of view. They certainly gave employment to a large number of masons, sculptors and various categories of wage earners but did not contribute to the wealth of Mathura, unless we presume that art objects carried the same value as they do today and were exported in good numbers. However they may have strengthened the donors ideologically and psychologically in pursuing their normal avocations.

Compared to donations, trade was certainly a far more important mechanism in the distribution of various types of goods, and it seems that most goods were priced in terms of metallic money. We have no idea about the nature of profit reaped by the middlemen. An impressionistic view of the information available about the coins suggests that the period 2nd cen. B.C. - 2nd cen. A.D. was an age of most plentiful coinage in ancient India. It would be wrong to think that from the monetary point of view the post-Maurya period was marked by decline and the Gupta period by prosperity. The period is noted for the finds of both Roman and indigenous coins. 129 finds of Roman coins have been reported so far⁶⁸, but most of these have been found south of the Vindhya. It is likely that some imitation Roman coins were being issued by Indian agencies, but the overwhelming part of transactions seems to have been carried on in indigenous coins. Possibly numerous agencies such as cities, guilds, « tribes » and ruling dynasties issued their coins in this period mostly in copper/bronze, lead, and potin, although gold coins appeared for the first time in good numbers under the Kuṣāṇas. So far the number of dies/moulds even for the published coins has not been worked out, but we possibly notice their largest number during this period. Apart from the circulation of uninscribed punch-marked coins this is a period of inscribed coins. Thus the city of Taxila issued three series of coins, (i) the *negama* series, (ii) the *paṃcanekame* series and (iii) the *hiraṇyasaṃe* serie. The first contained five varieties of legends and the last contained two such varieties⁶⁹. Although Taxila came under the Greeks, Scythians, Parthians and Kuṣāṇas in post-Maurya times, its coinage continued till its conquest

68. MANFRED G. RASCHKE, *Roman Coin Finds on the Indian Subcontinent: A Catalogue and Analysis* (Cyclostyled Paper; Place and Date not mentioned).

69. BELA LAHIRI, in JNSI, XXXVIII, pt. II, pp. 52-3. Hiraṇyāśrama may have been a market quarter in the city of Taxila. *Ibid.*, p. 54.

by the Kuṣāṇas⁷⁰. Taxilan coins have been found at Sonkh⁷¹ which shows commercial contacts between the two. Varanasi, Kauśāmbī, Vidisa, Erakiṇa, Bhāgila, Kaurara, Ujjayinī, Tripurī, Māhiṣmatī, and probably Tagar and Ayodhya, issued coins⁷². Indrapura or Indor also issued its coins⁷³. Puṣkalāvātī and Kapiśā also seem to have issued their coins⁷⁴. In some other cases such as Kādaṣa, Vatasvaka, Upagoasa, Upātikya it is not clear whether these were cities or « tribes »⁷⁵. Certain features of the city coinage system may be noted. Most cities lay on trade routes⁷⁶. At many places their coins are datable to about the third and second centuries B.C. and become rare in later layers⁷⁷. All of these coins were made of copper or of some alloy of it⁷⁸. In fact properly speaking they should be called bronze coins. In any case the point has to be stressed that these coins were meant for day-to-day transactions carried on by the ordinary folk. It is to be further noted that most city coins were die-struck⁷⁹, but in order to obtain even a rough idea of the volume of the coins we have to find out the number of dies used for this purpose. We may add that we have three types (I, II & III) of coins from Kauśāmbī; in addition we have three varieties with the legend *negama* or *gadhikan*⁸⁰. Three types of coins have been found from Eran⁸¹. Two varieties called A & B are known from Bhāgila near Sanchi⁸². Two types of Māhiṣmatī coins have been recovered⁸³.

In addition to city coins we have a large number of « tribal » coins which belong to a later period. It seems that those who issued these coins were not in the tribal stage of development, but divided into classes, as can be inferred from social distinctions in the states of the Mālavas and Kṣudrakas. However the nomenclature « tribal » persists and has been used by Allan and other scholars. They were coins issued by segmentary oligarchies. K. K. Dasgupta has made a detailed study of coins issued by 14 tribes, most of whom were located in Panjab and Rajasthan, and apparently their coins circulated in Mathura. Thus the Kuṇindas occupied a narrow strip of land between the Yamuna and the Sutlej⁸⁴. The Yaudheya coins have been found plentifully in the country

70. BELA LAHIRI, in JNSI, XXXVIII, pt. II, p. 54.

71. Cf. H. HARTÉL, « Some Results of the Excavations at Sonkh », German Scholars on India, II, New Delhi, 1976, p. 87.

72. BELA LAHIRI, *op. cit.*, p. 37.

73. Information from Professor A. M. Shastri.

74. BELA LAHIRI, *op. cit.*, pp. 37-8.

75. *Ibid.*, pp. 35-8.

76. *Ibid.*, p. 39.

77. *Ibid.*, p. 36.

78. *Ibid.*, p. 39.

79. *Ibid.*

80. *Ibid.*, pp. 42-3.

81. *Ibid.*, pp. 44-5.

82. *Ibid.*, p. 45.

83. *Ibid.*, p. 50.

84. ALLAN, CCBM, p. CIII.

to the westward of the Yamuna in Haryana and Panab⁸⁵. They belong to the period from the late second century B.C. to the early fourth century A.D.⁸⁶. Numerous coin moulds of the Yaudheyas have been obtained from Rohtak and Sunet⁸⁷. On the basis of K. K. Dasgupta we can count nearly 175 types of «tribal» coins⁸⁸, which would mean as many dies/moulds. But this list is not exhaustive. In addition to these coins were issued by numerous local dynasties, the most famous of these being the «Mitra» rulers. In the Pañcāla area we have a large number of such coins, especially from Ahicchatra. The Pañcāla coins have been carefully studied by Dr. K. M. Shrimali, in his doctoral thesis on the History of Pañcāla, which is yet to be published. On the basis of symbols, palaeography, etc., Agnimitra alone seems to have used nearly 100 dies/moulds⁸⁹. Apparently the Pañcāla coins may have circulated in the Mathura region.

An idea of the abundance of coins in this period can be had from the fact that the Śaka and Pahlava coins which circulated in north-western India had more than 200 monograms⁹⁰ which would presuppose a similar number of dies/moulds. Similarly, as can be said on the basis of the study of Professor A. M. Shāstri, the Maghas of Kausāmbī issued 121 varieties of coins, which would mean as many dies. If we carefully examine the coins issued by the foreign and indigenous dynasties in post-Maurya times we will notice a bewildering variety of dies/moulds used by them. In examining the number of moulds/dies we have to take into account the nature of symbols, palaeography, size, metal, etc.

It is strange that although Mathura was an important commercial centre, so far we have not recovered any coins issued by it as a city. Obviously its needs were served by the coins issued by the dynasties which ruled here and also by numerous other city and «tribal» and dynastic coins from outside. The Mitra and Datta coins «cover the period from the end of the third to the middle of the first century B.C.», when these were succeeded by a dynasty of the Sakas bearing the title *kṣatrapa* and *mahākṣatrapa*⁹¹. It seems that the Kuṣāṇas issued the largest number of copper coins, and I am told by a numismatist⁹² that Kuṣāṇa coppers are found in almost every important museum in India. So far as the Mathura Museum is concerned, it

85. *Ibid.*, p. CLI.

86. *Ibid.*, pp. CLII-CLIII.

87. K. K. DASGUPTA, *A Tribal History of Ancient India, A Numismatic Approach*, Calcutta, 1974, p. 255.

88. *Ibid.*, Appendix IV.

89. I gather this from a chart prepared by Dr. Shrimali and also from discussion with him.

90. K. WALTON DOBBINS, *Saka-Pahlava Coinage*, Varanasi, 1973, pp. 149-93.

91. ALLAN, CCBM, p. CXI.

92. Information from Dr. Pratipal Bhatia.

contains copper coins of Soter Magus⁹³, Wema Kadphises⁹⁴, Huvīṣka⁹⁵ and Indo-Scythians or Kuṣāṇa type⁹⁶; a copper coin of late Indo-Sassanian type is also available⁹⁷. Coppers were meant for the use of the ordinary people, but for big transactions gold coins were issued by the Kuṣāṇas on a large scale. Vogel's catalogue of the antiquities of the Mathura Museum lists the gold coins of Scytho-Sassanian or Kuṣāṇo-Sassanian type, of the later Kuṣāṇa type and of the later Indo-Kuṣāṇa or Little Kuṣāṇa type⁹⁸. Some coins have also been recovered from Sonkh and other excavations, but the general impression is one of the predominance of coppers in the Mathura region, which would imply that marketisation had affected even the common people. The general picture of coinage in India in the period 2nd cen. B.C. - 2nd cen. A.D. is consistent with the high peak of urbanism, handicrafts and commerce in this period.

No background study of trends in the economic history of Mathura can be complete without some idea of the technological factors operating in this period. There is little doubt that urbanism reached its climax in northern and western India in this period. Several factors contributed to it. One such factor was the change in building methods. At Mathura⁹⁹, and Ganwaria¹⁰⁰ in Basti district in north-eastern Uttar Pradesh the flooring was made of brick concrete mixed with lime. This indicates the use of *surkhi* which contributed to the stability of structures. Further baked tiles for roofing appear in this period at several places in both the Sātavāhana¹⁰¹ and Kuṣāṇa zones including Mathura¹⁰². These innovations added to the solidity and longevity of urban structures in the early centuries of the Christian era.

In addition to improvement in housing facilities we notice some new features in the use of horse, which may have indirectly helped commerce. Stirrups were illustrated both at Sanchi and Mathura¹⁰³. Although these seem to have been loose ropes in the form of toe stirrups and less in use, they may have provided better control of the horse to

93. VOGEL, AMM, p. 205.

94. *Ibid.*

95. *Ibid.*

96. *Ibid.*

97. *Ibid.*

98. *Ibid.*

99. Archaeological Survey of India (cyclostyled) *Report of the Director General for the Years 1974-78*, 25th Meeting of the Central Advisory Board of Archaeology, New Delhi, 9 December 1979, p. 20.

100. *Ibid.*, p. 28.

101. *Ibid.*, p. 38; *Indian Archaeology 1974-75 - A Review*, p. 32.

102. *Indian Archaeology 1974-75 - A Review*, pp. 49-50. There seems to be some confusion in ascribing the use of roof tiles to Period I (*circa* fourth-third century B.C.) at Mathura on p. 49 (*ibid.*).

103. N. P. JOSHI, *Life in Uttarāpatha*, pp. 107-9.

the caravan leader. Saddles¹⁰⁴ and bridles¹⁰⁵ were also in use in this period, but the latter were more common. Although the equestrian technology primarily helped fighters, it may have also been of use to the trade caravans which certainly needed protection on long journeys. Moreover although camels were not so common as means of transport¹⁰⁶, the Central Asians introduced camels of double humped Bactrian variety, which were controlled by reins and switches made of twisted stuff¹⁰⁷. It is interesting that even bulls were used for riding and controlled by thongs and long staffs¹⁰⁸. Another improvement in transport seems to have been the use of bridge. Literature of about the 2nd cen. B.C. to the 2nd cen. A.D. shows that moats around fortification were provided with bridges (*samkrama*)¹⁰⁹. It is likely that some kind of bridges, apart from boat bridges, may have been put up for crossing rivers intersecting the roads.

Apart from some of these improvements in transport technology we may also take note of the beginning of the techniques of making steel which seems to have appeared around 100 B.C. The technique of glass blowing may have been introduced about the beginning of the Christian era. While we have considerable evidence of the sale and manufacture of iron goods at Mathura, no such evidence is available about glass manufacture. But, as M. G. Dikshit has shown, the period 200 B.C.-A.D. 200 saw the high watermark of glass manufacture in India, and it is likely that Mathura had some share in it. We have already referred to the possible introduction of growing mulberry silk in this period.

But the most revolutionary change that affected foreign trade and economic life of the cities was the discovery of the monsoons. Its date is placed around A.D. 48, but the finds of Roman coins in south India from an earlier date suggests that this discovery may have occurred around the beginning of the Christian era. The discovery not only immensely helped sea trade but also encouraged export and import from the hinterland and interior.

According to a Hindi saying Mathura occupies a unique place in the three traditional worlds (*tīn lok se Mathurā nyārī*). This saying may have been derived from the heretical character of the city in the period under consideration. It was only in later times that this place became a centre of the Kṛṣṇa cult. But from the economic point of view Mathura's special feature lay in not possessing a strong rural base. Whatever importance it enjoyed in crafts, commerce and urbanism was derived mainly from certain economic and technological developments

104. *Ibid.*, p. 107.

105. *Ibid.*, p. 105.

106. *Ibid.*, pp. 109-11.

107. *Ibid.*

108. *Ibid.*, p. 111.

109. *Ibid.*, p. 248.

which characterised almost the whole of northern, western and a good part of coastal India. Mathura's share in all this development was substantial because of the strategic position it enjoyed. It is significant that the general decline in trade and urbanism based on artisanal and commercial activities from the third-fourth centuries A.D. also affected Mathura as it did many other towns in northern and western India. It is because of this that while we have seven layers of Kuṣāṇa structures at Sonkh, we have only one or two layers of Gupta structures. The later importance of Mathura was derived more from its being a place of pilgrimage than from its being a centre of crafts, commerce and administration.

Delhi.

ABBREVIATIONS

- AMM = J. PH. VOGEL, *Catalogue of the Archaeological Museum at Mathura*, Allahabad, 1910.
 CCBM = J. ALLAN, *Catalogue of Coins in the British Museum, Ancient India*, London, 1936.
 EI = *Epigraphia Indica*.
 JESHO = *Journal of the Economic and Social History of the Orient*, Leiden.
 JNSI = *Journal of the Numismatic Society of India*, Varanasi.
 JUPHS = *The Journal of the United Provinces Historical Society*, Lucknow.
Lüders' List = *Epigraphia Indica*, Volume X, 1909-10, Appendix.
 MI = H. LÜDERS, *Mathura Inscriptions*, ed. K. L. Janert, Gottingen, 1961.
Sel. Inscr. = D. C. SIRCAR, *Select Inscriptions*, Volume I, University of Calcutta, 1965.